REMARKS/ARGUMENTS

Telephone Interview Summary Record

This is further to a telephone discussion with Examiner Elve on July 3, 2007. It was understood from that interview that the best way to advance prosecution of this application is to file a Request for Continued Examination, and accordingly this paper is accompanied with an RCE request. The Examiner is requested to take into account the remarks and arguments set out below.

Status of the Claims

The claims are the same as those submitted with the Supplemental amendment filed May 11, 2007.

Rejections Based on the Prior Art

In the final Office Action of July 25, 2006, the Examiner had rejected all of the pending claims, except for claims 20-23 and 26-30, as being anticipated by the Meltzer et al. reference. The Examiner had then further rejected claims 20-23 and 26-30 as being obvious if the disclosure in the Mizuno published European application was further considered.

It is submitted that the claims as now amended are both novel and inventive with respect to both of these references, and the art as a whole, and that the rejection of the claims should be withdrawn. The Examiner is referred to arguments submitted in the response filed November 27, 2006 and further arguments set out below.

Anticipation Standard Under 35 U.S.C. 102(b)

The Examiner is respectfully referred to MPEP 2131, which details your requirements for a reference to anticipate a claim. Thus, the first citation in this section of MPEP is:

> "A claim is anticipated only if each and every element as set forth in the claim is found, either in expressly or inherently described, in a single prior art reference". *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Thus, fundamentally, a citation under 35 U.S.C. 102(b) must disclose "each and every element" of a claim. It may not be necessary for there to be exact correspondence in the language used, but each element must be found in the cited reference. There are rare circumstances where a secondary reference can be used, but this is simply to clarify a primary reference, e.g. with respect to: proving that the primary reference contains an "enabling disclosure"; explaining the meaning of a term in the primary reference; or showing that a characteristic is inherent in the primary reference (see MPEP 2131.01). None of these exceptions apply in this case.

Claim 1 of the present application was amended in the previous Response filed April 24, 2006 to define the controller, in element (e), as follows:

> (e) a controller for controlling the first reactant supply means to provide an additional amount of the first reactant to the fuel cell cathode based on the fuel cell state variable, and for controlling the second reactant supply means to provide an additional amount of the second reactant to the fuel cell anode based on the fuel cell state variable, whereby flooding occurring in either one of the anode and cathode is displaced by the additional amounts of the first and second reactants.

Thus, it is now clearly specified that the controller provides <u>both</u> an additional amount of the first reactant and an additional amount of the second reactant, to displace flooding from both the anode and cathode sides of the fuel cell.

If one considers the Meltser et al. reference, this clearly teaches no such characteristic. Rather, Meltser et al. teaches remarkably little about dealing with the flooding problem, and any mention of flooding is incidental. One can note the passage at column 8, lines 25 and 26 which refers to actions to be taken if there is a hydrogen bridging alert, and these include, for example, "throttling back on the hydrogen pressure, or increasing the cathode gas pressure, inter alia". It can only be assumed that this is the passage that provides the basis for the Examiner's argument that Meltser et al. provides that: "Corrective action may entail a decrease in hydrogen supply or an increase in cathode supply". One can further note that the sentence at the end of this paragraph in column 8, lines 36-38, provides: "H_2O flooding, on the other hand may be mitigated by flowing excess air through the cathode flow channel."

It is therefore argued that, in relation to a flooding condition, Meltser et al. teaches only that excess air be passed through the cathode side; there is no express teaching of what action to take on the anode side. There is reference in Meltzer et al. that, for other conditions, action taken can include "throttling back" the hydrogen supply. There is no, and we would emphasize this point, teaching in Meltser et al. of increasing the hydrogen supply, for any condition.

It can be noted that, in the context of flooding, the teaching appears to be that one needs to: (1) take action to reduce the flooding on the cathode side; and (2) take action to reduce the reaction rate, since the reaction generates more water which can worsen the flooding situation. Thus, the teaching appears to be to increase the flow rate on the cathode side to displace the flooding on the cathode side, while simultaneously reducing the hydrogen supply, thereby to reduce the rate of generation of further water.

In contrast, the teaching of the present invention is directly contrary to this. The present inventors take the approach that, to eliminate flooding, it is desirable to increase the flow rate on both the anode and cathode sides of the cell or cell stack. Increasing flow rates may increase the reaction rate and hence generation of moisture.

On the other hand, this can be restricted, through the back voltage present across the anode and cathode. Alternatively, if the flow rates were increased enough, these will overcome any additional generation of water. Further, additional power generated can be used to power blowers necessary for the increased flow rate of the reactants.

Accordingly, it is submitted that the Examiner's analysis and rejection of the claims does not comply with the requirements of 35 U.S.C. 102 and the Examiner is requested to withdraw this rejection. It is noted that the Examiner's arguments in the final Action appear to be largely a restatement of arguments from the previous Action. In particular, it is noted that these arguments fail to take into account the fact that the main claim, claim 1 now requires increase in the flow rate of both reactants. Further, the Examiner's argument that the corrective action in Meltser et al. "may entail a decrease in hydrogen supply..." is a clear acknowledgement that Meltser et al. teach away from the present invention.

Turning to the published European application '463, similar comments apply. This application is directed to a method of controlling a "polyelectrolytic fuel cell". Like Meltzer, any teaching in the reference concerning flooding problems in a fuel cell are directed solely to the cathode or oxygen side of the cell. Thus, it teaches techniques such as increasing the flow rate, increasing the pressure or decreasing the humidity of the oxidizing gas. Importantly, there is no suggestion or discussion of what action should be taken on the anode or fuel side and no discussion of what action should be taken where recirculation is provided.

Present Invention

In contrast, the present invention provides a number of features not found in the references and now clearly claimed.

In particular, the present invention provides a controller connected to the supply means for both of the first and second reactants. In use, if a flooding condition is

detecting, then additional amounts of both the fuel and the oxygen can be provided to clear up flooding conditions on both sides of each fuel cell.

Significantly, claim 1 has now been amended to introduce a feature of a recirculation line being provided for the second reactant, i.e. the fuel. Recirculation has the advantage that relatively high flow rates of gas can be maintained, even if the actual flow rate of the make up gas, necessary to make up for gas consumed by reaction, is relatively small. However, recirculation provides different problems when a flooding condition can occur. Thus, in some recirculation schemes, it is possible to operate the fuel cell in a "dead ended" mode for most of the time, or with limited purging or venting of excess fuel, so as to prevent wastage of fuel. It is recognized that some venting or purging is usually required, to prevent build up of contaminants that are not consumed by reaction.

What the present invention provides is, in addition to a recirculation line for the second reactant or fuel, a purge means, operable to purge at least a portion of the second reactant, when a fuel cell flooded condition is indicated, so as to permit excess moisture to be discharged through the purge or vent.

A review of the references cited by the Examiner, or indeed any other references, will show that the art is entirely silent on such a possible method or control scheme. It is therefore submitted that any combination of the references will simply fail to each all the features now claimed in claim 1.

Claim 10, directed to the method aspect of the invention has been similarly amended.

Review by the Board of Appeals

As this application had already proceeded at least part way down the appeal route, the Examiner indicated that she would attempt to obtain guidance form the Appeal Board. The Examiner is requested, if possible, to obtain informal guidance from the Appeal Board on further prosecution for this application.

Early review and allowance are requested.

Respectfully submitted,

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